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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/520,915	01/07/2005	Satoshi Mizutani	112857-491	5221
29175	7590	07/10/2009	EXAMINER	
K&L Gates LLP P. O. BOX 1135 CHICAGO, IL 60690				CHUO, TONY SHENG HISLNG
ART UNIT		PAPER NUMBER		
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary		Application No.	Applicant(s)
10/520,915		MIZUTANI ET AL.	
Examiner	Art Unit		
Tony Chuo	1795		

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If no period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) Responsive to communication(s) filed on 24 June 2009.
- 2a) This action is FINAL. 2b) This action is non-final.
- 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) Claim(s) 41,42,44,45,47-64,66,67 and 69-80 is/are pending in the application.
 - 4a) Of the above claim(s) 50-62 and 72-80 is/are withdrawn from consideration.
- 5) Claim(s) _____ is/are allowed.
- 6) Claim(s) 41,42,44,45,47-49,63,64,66,67 and 69-71 is/are rejected.
- 7) Claim(s) _____ is/are objected to.
- 8) Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) The specification is objected to by the Examiner.
- 10) The drawing(s) filed on _____ is/are: a) accepted or b) objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 - a) All b) Some * c) None of:
 1. Certified copies of the priority documents have been received.
 2. Certified copies of the priority documents have been received in Application No. _____.
 3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

<input checked="" type="checkbox"/> Notice of References Cited (PTO-892)	<input type="checkbox"/> Interview Summary (PTO-413)
<input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-544)	Paper No(s)/Mail Date: _____
<input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)	<input type="checkbox"/> Notice of Informal Patent Application
Paper No(s)/Mail Date: _____	<input type="checkbox"/> Other: _____

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 6/24/09 has been entered.

Response to Amendment

2. Claims 41, 42, 44, 45, 47-64, 66, 67, and 69-80 are currently pending. Claims 43, 46, 65, and 68 are cancelled. Claims 50-62 and 72-80 are withdrawn from further consideration as being drawn to a non-elected invention. The previous objection to the specification is withdrawn. The previous objection to claims 44 and 66 is withdrawn. The amended claims 41 and 63 do not overcome the previously stated 103 rejections. Therefore, upon further consideration, claims 41, 42, 44, 45, 47-49, 63, 64, 66, 67, and 69-71 stand rejected under the following 103 rejections. In addition, claims 41, 42, 49, 63, 64, and 71 are also rejected under the following new 102 rejection.

Double Patenting

3. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the

unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory obviousness-type double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent either is shown to be commonly owned with this application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement.

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

4. Claim 63 is provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1, 7, and 8 of copending Application No. 11/267,641. Although the conflicting claims are not identical, they are not patentably distinct from each other because the subject matter of claim 63 is fully anticipated by the claims of copending Application No. 11/267,641.

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

5. Claims 41, 42, 63, and 64 are provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1-3, 9-11, 18, 19, 26, and 27 of copending Application No. 12/026,594. Although the conflicting claims are not identical, they are not patentably distinct from each other

because the subject matter of claims 41, 42, 63, and 64 is fully anticipated by the claims of copending Application No. 12/026,594.

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

6. Claims 41, 49, 63, and 71 are provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1, 2, 7, and 8 of copending Application No. 11/268,010. Although the conflicting claims are not identical, they are not patentably distinct from each other because the subject matter of claims 41, 49, 63, and 71 is fully anticipated by the claims of copending Application No. 11/268,010.

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

7. Claim 63 is provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 4, 7, 9, and 10 of copending Application No. 11/267,116. Although the conflicting claims are not identical, they are not patentably distinct from each other because the subject matter of claim 63 is fully anticipated by the claims of copending Application No. 11/267,116.

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

8. Claims 41, 42, 63, and 64 are provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1-3 and 10-12 of copending Application No. 11/225,540. Although the conflicting claims are

not identical, they are not patentably distinct from each other because the subject matter of claims 41, 42, 63, and 64 is fully anticipated by the claims of copending Application No. 11/225,540.

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

Claim Rejections - 35 USC § 102

9. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

10. Claims 41, 42, 49, 63, 64, and 71 are rejected under 35 U.S.C. 102(b) as being anticipated by Turner et al (US 6203944).

The Turner reference discloses a battery comprising: a cathode, an anode, and an electrolyte, wherein the anode contains an anode material having a reaction phase containing tin (element capable of generating an intermetallic compound with lithium), iron, and graphite (carbon), wherein specific examples of the anode include 6 wt% carbon and 7.2 wt% carbon (See column 1, lines 64-67, column 6, lines 28-45, and Examples 17 and 19). It also discloses crystal sizes of less than about 500 angstrom (0.05 μ m) (See column 5, lines 7-11).

Examiner's note: It is the position of the examiner that the property "A peak of carbon that is obtained in a region lower than about 284.5 eV by x-ray photoelectron

spectroscopy" is an inherent property of the Turner anode material because Turner et al discloses an anode material with the same composition as the anode material recited in claims 41 and 63 of the present invention.

Claim Rejections - 35 USC § 103

11. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

12. Claims 41, 42, 47-49, 63, 64, and 69-71 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kawakami et al (JP 2000-311681).

The Kawakami reference discloses a battery comprising: a positive electrode, a negative electrode, and an electrolyte, wherein the negative electrode contains a negative electrode material having a reaction phase containing tin (element capable of generating an intermetallic compound with lithium); (cobalt, nickel, iron, or copper); and carbon (See paragraph [0050],[0099]).

It also discloses a ratio of carbon in the reactant phase that is 0.8 wt% for $\text{Sn}_{40.5}\text{Co}_{53.9}\text{C}_{5.6}$, 3.9 wt% for $\text{Sn}_{1.1}\text{Fe}_{3.0}\text{C}_{1.0}$, and 1.4 wt% for $\text{Sn}_{59.9}\text{Co}_{30.2}\text{C}_{9.9}$ (See Tables 7, 8, 11, and 12).

It also discloses a specific surface area of $5.0 \text{ m}^2/\text{g}$ (See paragraph [0047]).

It also discloses an average particle size of $10 \mu\text{m}$ or less (See paragraph [0047]).

Examiner's note: It is the position of the examiner that the property "A peak of carbon that is obtained in a region lower than about 284.5 eV by x-ray photoelectron spectroscopy" is inherent to the Kawakami negative electrode material because Kawakami discloses an alloy with a composition that is close enough that one would not expect a difference in properties. In addition, the Kawakami negative electrode is also formed by the same planet ball mill device.

However, Kawakami et al does not expressly teach a ratio of carbon in the reaction phase that ranges from about 5% by weight to about 40% by weight.

However, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the Kawakami negative electrode material to include a ratio of carbon in the reaction phase that ranges from about 5% by weight to about 40% by weight because even if the range of prior art and the claimed range do not overlap, obviousness may still exist if the ranges are close enough that one would not expect a difference in properties (*In re Woodruff* 16 USPQ 2d 1934 (Fed. Cir. 1990)). In addition, there is no evidence of the criticality of the claimed range of carbon ratio in the reaction phase.

13. Claims 41, 42, 48,49, 63, 64, 70, and 71 are rejected under 35 U.S.C. 103(a) as being unpatentable over Dahn et al (WO 01/48840).

The Dahn reference discloses a battery comprising: a positive electrode, a negative electrode, and an electrolyte, wherein the negative electrode contains a negative electrode material having a reaction phase containing tin (element capable of

generating an intermetallic compound with lithium), manganese, and carbon (SnMn₃C)
(See Example 1).

It also discloses a ratio of carbon that is 4 wt% as calculated from Example 1.

It also discloses a particle size that range from 2 μm to 30 μm (See claim 7].

It also discloses crystalline grains that are no greater than 20 nanometers (See
claim 8).

Examiner's note: It is the position of the examiner that the property "A peak of carbon that is obtained in a region lower than about 284.5 eV by x-ray photoelectron spectroscopy" is inherent property of the Dahn negative electrode material because Dahn discloses an alloy with a composition that is close enough that one would not expect a difference in properties. In addition, it is also formed by a similar ball mill device.

However, Dahn et al does not expressly teach a ratio of carbon in the reaction phase that ranges from about 5% by weight to about 40% by weight.

However, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the Dahn negative electrode material to include a ratio of carbon in the reaction phase that ranges from about 5% by weight to about 40% by weight because even if the range of prior art and the claimed range do not overlap, obviousness may still exist if the ranges are close enough that one would not expect a difference in properties (*In re Woodruff* 16 USPQ 2d 1934 (Fed. Cir. 1990)). In addition, there is no evidence of the criticality of the claimed range of carbon ratio in the reaction phase.

14. Claims 44, 45, 66, and 67 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kawakami et al (JP 2000-311681). The Kawakami reference is applied to claims 41 and 63 for reasons stated above. In addition, Kawakami also discloses a negative electrode material that contains an alloy of tin, cobalt, carbon, and a fourth element (See Table 11, sample no. 20). It also discloses an element A that is a transition metal element selected from Cr, Mn, Fe, Co, Ni, Cu, Mo, Tc, Ru, Pd, Ag, Ir, Pt, Au, Ti, V, Y, Sc, Zr, Nb, Hf, Ta, and W (See paragraph [0033]). It also discloses an element X of the alloy that is selected from O, F, N, Mg, Ba, Sr, Ca, La, Ce, Si, Ge, C, P, B, Bi, Sb, Al, In, S, Se, Te, and Zn (See Abstract).

However, Kawakami et al does expressly teach a reaction phase that contains tin and at least one selected from the group consisting of zinc, indium, and silver; or a reaction phase that further contains at least one selected from the group consisting of elements from Group 4 to Group 6 of the periodic table.

However, it would have been obvious to one of ordinary skill in the art at the time the invention was made to try to form an alloy from a finite number of identified elements that is used as an anode material with a reasonable expectation of success such as long cycle life, high capacity, and high energy density.

Response to Arguments

15. Applicant's arguments filed 6/24/09 have been fully considered but they are not persuasive.

The applicant argues that Tables 6-1 and 6-2 on pages 37 and 38 of the specification as filed provide specific proof of this limitation. As shown in the table, capacity retention ratios reach 92% at 5%wt carbon and 91% at 25%wt, whereas at 2 %wt it's only 81%, and at 0.5% it's only 72%. Similarly, 40%wt carbon has a capacity retention value of 85% whereas at 50%wt carbon, the value drops to 75%. Table 6-2 also demonstrates the criticality of this value. Values of 1.5 %wt carbon and 3 %wt carbon show capacity retention ratios of 65% and 78%, but an anode material 8%wt carbon to about 45%wt carbon shows capacity retention ratios of 85- 89%.

In response, the examiner disagrees that Tables 6-1 and 6-2 provide proof of the criticality of the claimed range of ratio of carbon in the reaction phase. Tables 6-1 and 6-2 do not provide sufficient data points to show the criticality of the range from about 5 wt% to about 40 wt%. Although Table 6-1 does show a decrease in capacity retention ratio for the ratio of carbon of 2 wt%, there are no data points for any ratios between 2 wt% and 5 wt%. Specifically, there is no data point for the ratio of carbon of 4 wt% as disclosed in the Kawakami and Dahn references. Similarly, Table 6-2 also does not provide sufficient data points to show the criticality of the range from about 5 wt% to about 40 wt% because there are no data points between 3 wt% and 8 wt%. Therefore, the examiner maintains the contention that the 4 wt% ratio of carbon taught by Kawakami and Dahn is close enough to the 5 wt% ratio of carbon recited in the claims that one skilled in the art would not expect a difference in properties.

The applicant further argues that neither Dahn nor Kawakami teach or suggest the large amounts of carbon that this claimed invention covers. In response, claims 41

and 63 recite a range of ratio of carbon from about 5 wt% to about 40 wt%. Although the upper limit of this range is much higher than the ratio of carbon disclosed in Kawakami and Dahn, the lower limit of this range is close enough to the ratio of carbon disclosed in Kawakami and Dahn such that one skilled in the art would not expect a difference in properties.

The applicant further argues that Dahn teaches away from the claimed invention, and excludes the presumption of obviousness that the Patent Office attempts to assert based upon it. The applicant further argues that the teaching indicates that one of ordinary skill in the art would not be motivated to prepare compounds such as $\text{SnMn}_3\text{C}_{1+x}$ because Dahn actually teaches a single chemical composition, not a range of carbons in the presence of tin and Mn or Fe.

In response, there is no teaching in Dahn that teaches away from the claimed invention. Further, the applicant has not provided any reasonable explanation as to why one of ordinary skill in the art would not be motivated to prepare compounds such as $\text{SnMn}_3\text{C}_{1+x}$.

The applicant further argues that the genus of compounds is enormously broad. The formula Sn.A.X, as described by Kawakami in the abstract, can include any known transition metal compound for A and 40 different elements for X. Of course, as noted above, X is optional. To put this number in context, there are about 30 transition metals in rows 3d to 5d, so $30 + 40 = 70$ elements that Kawakami teaches can be used. This means that Kawakami teaches an anode material comprising Sn and some combination of 70 elements out of a possible 76 elements that are even an option. In contrast, the

species defined by the claimed invention is an anode having tin, carbon, and a narrow selection of other elements. Dependent claims 44 and 66 in particular require tin, carbon, at least one of zinc, indium and silver, and at least one of nickel, copper, iron, cobalt and manganese. This specific species is much smaller than the genus the Patent Office asserts makes the species obvious.

In response, the examiner disagrees that the genus taught by Kawakami is enormously broad. The Kawakami reference discloses in paragraph [0033] that the transition metal element is chosen from the group of Cr, Mn, Fe, Co, Ni, Cu, Mo, Tc, Ru, Pd, Ag, Ir, Pt, Au, Ti, V, Y, Sc, Zr, Nb, Hf, Ta, and W. This group of 23 element is much smaller than the group of transition metal elements argued by the applicant. In addition, 10 of the 23 elements read on the elements recited in claims 44, 45, 66, and 67. Therefore, the examiner maintains the contention that one of ordinary skill in the art has good reason to pursue the known potential solutions within his or her technical grasp with a reasonable expectation of success. According to MPEP 2144.08, "... a limited number of variations in the generic chemical formula inherently anticipated a claimed species within the genus because "one skilled in [the] art would... envisage each member " of the genus. In re Petering, 301 F.2d 676, 681, 133 USPQ 275, 280 (CCPA 1962)".

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tony Chuo whose telephone number is (571)272-0717.

The examiner can normally be reached on M-F, 9:00AM to 5:30PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick Ryan can be reached on (571) 272-1292. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

TC

/Jonathan Crepeau/
Primary Examiner, Art Unit 1795